

S/N 10/589,591

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=> s (vapor or gas)(5a)(copolmeri? or polymeri?) and poured(4a)(density or densities)

L1 93 (VAPOR OR GAS)(5A)(COPOLMERI? OR POLYMERI?) AND POURED(4A)(DENSITY OR DENSITIES)

=> s (vapor or gas)(5a)(copolmeri? or polymeri?) and (mass flow)(3a)(rate# or flux)
L2 305 (VAPOR OR GAS)(5A)(COPOLMERI? OR POLYMERI?) AND (MASS FLOW)(3A)(RATE# OR FLUX)

=> s l1 and l2
L3 3 L1 AND L2

=> d l3 1-3 ibib abs

L3 ANSWER 1 OF 3 USPATFULL on STN

S/N 10/589,591

ACCESSION NUMBER: 2008:66564 USPATFULL
TITLE: Method for Controlling the Polymer Flow in a
Polymerization Process
INVENTOR(S): Mei, Gabriele, Ferrara, ITALY
Bertolini, Stefano, Falconara Maritima, ITALY
PATENT ASSIGNEE(S): Basell Poliolefine Italia s.r.l., Milan, ITALY
(non-U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 2008058484	A1	20080306
APPLICATION INFO.:	US 2005-589591	A1	20050131 (10)
	WO 2005-EP1000		20050131
			20060816 PCT 371 date

	NUMBER	DATE
PRIORITY INFORMATION:	EP 2004-100856	20040303
DOCUMENT TYPE:	Utility	
FILE SEGMENT:	APPLICATION	
LEGAL REPRESENTATIVE:	Basell USA Inc., Delaware Corporate Center II, 2 Righter Parkway, Suite #300, Wilmington, DE, 19803, US	
NUMBER OF CLAIMS:	10	
EXEMPLARY CLAIM:	1	
NUMBER OF DRAWINGS:	1 Drawing Page(s)	
LINE COUNT:	731	

AB A method for controlling the flowability of polymer particles flowing downward in a densified form inside a polymerization reactor, in which one or more monomers are gas-phase polymerized in the presence of a polymerization catalyst, the density of solid (Kg of polymer per m.sup.3 of reactor occupied by the polymer) being higher than 80% of the "poured bulk density" of the polymer, the method being characterized in that a liquid stream is continuously fed into the polymerization reactor at a mass flow rate per unity of reactor surface higher than 30 Kg/h m.sup.2.

L3 ANSWER 2 OF 3 USPATFULL on STN

ACCESSION NUMBER: 2001:14591 USPATFULL
TITLE: High activity metallocene polymerization process
INVENTOR(S): Muhle, Michael E., Kingwood, TX, United States
Vaughan, George Alan, Houston, TX, United States
PATENT ASSIGNEE(S): Exxon Chemical Patents Inc, Houston, TX, United States
(U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 6180736	B1	20010130
APPLICATION INFO.:	US 1997-992521		19971217 (8)

	NUMBER	DATE
PRIORITY INFORMATION:	US 1996-33687P	19961220 (60)
DOCUMENT TYPE:	Utility	
FILE SEGMENT:	Granted	
PRIMARY EXAMINER:	Wu, David W.	
ASSISTANT EXAMINER:	Rabago, R.	
LEGAL REPRESENTATIVE:	Malpass, Gerald D., Reidy, Joseph F., Runyan, Charles E.	

NUMBER OF CLAIMS: 14
EXEMPLARY CLAIM: 1
LINE COUNT: 1133

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The disclosed invention relates to a polymerization process comprising contacting ethylene, and optionally, one or more olefinically unsaturated comonomers, with an active supported Group 3, 4, 5, or 6 metallocene catalyst system having an unsubstituted or substituted fused-ring cyclopentadienyl ligand, preferably indenyl or fluorenyl, and a substituted or unsubstituted cyclopentadienyl ligand under gas-phase or slurry polymerization conditions. The process is suitable for the production of high-density polyethylene homopolymers and copolymers. The benefits to industrial practice are both the ease of preparation and low-cost of the precursor metallocene compound and the commercially feasible polymerization activity levels in stable, low fouling level reactor conditions surprisingly associated with it. Additionally, the polymers made under the invention process conditions have narrow molecular weight distributions, low MI, and low values for MIR.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 3 OF 3 USPATFULL on STN

ACCESSION NUMBER: 1998:27738 USPATFULL

TITLE: Process and apparatus for the gas-phase polymerization of olefins

INVENTOR(S): Govoni, Gabriele, Renazzo, Italy
Rinaldi, Roberto, Mantova, Italy
Covezzi, Massimo, Ferrara, Italy

PATENT ASSIGNEE(S): Montell North America Inc., Wilmington, DE, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 5728353		19980317
APPLICATION INFO.:	US 1996-711133		19960909 (8)
RELATED APPLN. INFO.:	Division of Ser. No. US 1996-619455, filed on 20 Mar 1996, now abandoned which is a division of Ser. No. US 1995-469732, filed on 6 Apr 1995, now abandoned which is a division of Ser. No. US 1994-315669, filed on 30 Sep 1994, now abandoned which is a continuation of Ser. No. US 1993-76329, filed on 14 Jun 1993, now abandoned		

	NUMBER	DATE
PRIORITY INFORMATION:	IT 1992-MI1496	19920618
	IT 1992-MI1499	19920618

DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Kim, Christopher
NUMBER OF CLAIMS: 10
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 4 Drawing Figure(s); 4 Drawing Page(s)
LINE COUNT: 945

AB Gas-phase process for the preparation of polymers and copolymers of olefins CH.sub.2 .dbd.CHR, carried out in at least 2 fluidized or mechanically agitated bed gas-phase reactors operating under different reaction conditions so as to obtain different polymers in the different reactors; the process is characterized in that the polymer is at least partially recycled among the different reactors by using ratios of the

flow rate of circulation among the different reactors to the discharge
flow rate comprised between 2 and 6.

=> d 13 2 ibib hit

L3 ANSWER 2 OF 3 USPATFULL on STN

ACCESSION NUMBER: 2001:14591 USPATFULL
TITLE: High activity metallocene polymerization process
INVENTOR(S): Muhle, Michael E., Kingwood, TX, United States
Vaughan, George Alan, Houston, TX, United States
PATENT ASSIGNEE(S): Exxon Chemical Patents Inc, Houston, TX, United States
(U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 6180736	B1	20010130
APPLICATION INFO.:	US 1997-992521		19971217 (8)

	NUMBER	DATE
PRIORITY INFORMATION:	US 1996-33687P	19961220 (60)
DOCUMENT TYPE:	Utility	
FILE SEGMENT:	Granted	
PRIMARY EXAMINER:	Wu, David W.	
ASSISTANT EXAMINER:	Rabago, R.	
LEGAL REPRESENTATIVE:	Malpass, Gerald D., Reidy, Joseph F., Runyan, Charles E.	
NUMBER OF CLAIMS:	14	
EXEMPLARY CLAIM:	1	
LINE COUNT:	1133	

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The disclosed invention relates to a polymerization process comprising contacting ethylene, and optionally, one or more olefinically unsaturated comonomers, with an active supported Group 3, 4, 5, or 6 metallocene catalyst system having an unsubstituted or substituted fused-ring cyclopentadienyl ligand, preferably indenyl or fluorenyl, and a substituted or unsubstituted cyclopentadienyl ligand under gas-phase or slurry polymerization conditions. The process is suitable for the production of high-density polyethylene homopolymers and copolymers. The benefits to industrial practice are both the ease of preparation and low-cost of the precursor metallocene compound and the commercially feasible polymerization activity levels in stable, low fouling level reactor conditions surprisingly associated with it. Additionally, the polymers made under the invention process conditions have narrow molecular weight distributions, low MI, and low values for MIR.

SUMM Metallocene-catalyzed polymerization processes are well known in the art. Such processes employ catalyst systems which utilize metallocene compounds for the polymerization of olefinically unsaturated olefins. Metallocene compounds are defined as organometallic coordination compounds obtained as cyclopentadienyl derivatives of a transition metal. Processes which employ multiple metallocenes in a single polymerization reactor are also known. Bridged and unbridged biscyclopentadienyl Group 4 metal compounds are particularly representative; many are said to be useful for gas-phase polymerization or slurry polymerization where the use of supported catalysts is typical. For example, U.S. Pat. No. 4,808,561 describes a process for the polymerization of ethylene and other

olefins, and particularly homopolymers of ethylene and copolymers of ethylene and higher alpha-olefins and/or diolefins and/or cyclic olefins in the presence of a metallocene catalyst.

- SUMM U.S. Pat. No. 5,405,922 describes a gas phase polymerization process for polymerizing olefins utilizing a metallocene in a gas phase fluidized bed polymerization reactor operating in a condensed mode. In Tables 1-4, ethylene polymers having densities ranging from 0.9168 to 0.9222 g/cc are reported.
- SUMM Moreover, low productivity metallocene processes, like other low productivity processes, may suffer from poor operability. In particle-form polymerization processes, such as gas phase and slurry processes, lower catalyst productivity generally results in reduced average particle size (APS) and higher fines levels. Fines are readily carried over into the cycle gas loop of a fluidized-bed gas phase reactor, where can they can foul the cycle gas cooler and the reactor distributor plate, thereby inhibiting effective reactor cooling and bed fluidization. If the fines level becomes excessive, the reactor may become inoperable and require a shut-down and cleaning, resulting in lost production and increased costs.
- SUMM The invention comprises a polymerization process comprising contacting, under gas-phase or slurry polymerization conditions, ethylene; optionally, one or more comonomers; and a metallocene or mono-metallocene catalyst system which comprises a support material and a catalytic complex formed by activating a Group 3, 4, 5, or 6 biscyclopentadienyl metallocene, wherein said biscyclopentadienyl metallocene has one fused-ring cyclopentadienyl ligand, preferably indenyl, and a mono-cyclopentadienyl ligand. In a preferred embodiment the biscyclopentadienyl metallocene is unbridged. The benefits to industrial practice are both the ease of preparation and low-cost of the biscyclopentadienyl metallocene compound and the commercially feasible polymerization activity levels in stable, fouling free reactor conditions surprisingly associated with it. Additionally, the polymers of the inventive process have narrow molecular weight distributions as indicated by low values for MIR. In a preferred embodiment, the process further comprises adjusting the comonomer to ethylene ratio in the polymerization process to produce a polymer having a density greater than about 0.925 g/cc.
- SUMM In one embodiment, the process of the invention comprises contacting, under gas-phase or slurry polymerization conditions, a) ethylene; b) optionally, one or more comonomers; and c) a metallocene catalyst system comprising i) a support material and ii) a catalytic complex formed by activating a Group 3, 4, 5, or 6 biscyclopentadienyl metallocene, wherein said biscyclopentadienyl metallocene comprises an unsubstituted or substituted fused-ring cyclopentadienyl ligand and an unsubstituted or substituted mono-cyclic cyclopentadienyl ligand.
- SUMM In another embodiment, the process of the invention comprises contacting, under gas-phase or slurry polymerization conditions, a) ethylene; b) optionally, one or more comonomers; and c) a mono-metallocene catalyst system comprising i) a support material and ii) a catalytic complex formed by activating a Group 3, 4, 5, or 6 biscyclopentadienyl metallocene, wherein said biscyclopentadienyl metallocene comprises an unsubstituted or substituted fused-ring cyclopentadienyl ligand and an unsubstituted or substituted mono-cyclic cyclopentadienyl ligand.

SUMM In other embodiments, the inventive process is directed toward copolymerization and comprises contacting ethylene, one or more comonomers, and the metallocene or mono-metallocene catalyst. In an additional embodiment, the polymerization conditions are gas phase conditions. In still another embodiment; the polymerization conditions are slurry conditions. In yet another embodiment, the biscyclopentadienyl metallocene is a Group 4 metallocene comprising an unsubstituted or substituted fused-ring cyclopentadienyl ligand and an unsubstituted or substituted mono-cyclic cyclopentadienyl ligand. In a preferred embodiment the biscyclopentadienyl metallocene is a Group 4 metallocene comprising an unsubstituted or substituted indenyl group and an unsubstituted or substituted cyclopentadienyl group.

SUMM In a particularly preferred embodiment, the process of the invention comprises contacting, under gas-phase or slurry polymerization conditions, a) ethylene; b) optionally, one or more comonomers; and c) a metallocene catalyst system comprising i) a support material and ii) a catalytic complex formed by activating a Group 3, 4, 5, or 6 unbridged biscyclopentadienyl metallocene, wherein said unbridged biscyclopentadienyl metallocene comprises an unsubstituted or substituted fused-ring cyclopentadienyl ligand and an unsubstituted or substituted mono-cyclic cyclopentadienyl ligand. The unbridged biscyclopentadienyl metallocene is preferably a Group 4 unbridged biscyclopentadienyl metallocene. More preferably, the metallocene is a Group 4 unbridged biscyclopentadienyl metallocene, the unsubstituted or substituted fused-ring cyclopentadienyl ligand is unsubstituted or substituted indenyl or fluorenyl, and the unsubstituted or substituted mono-cyclic cyclopentadienyl ligand is unsubstituted or substituted cyclopentadienyl. Yet more preferably the unbridged biscyclopentadienyl metallocene is a Group 4 unbridged biscyclopentadienyl metallocene comprising a substituted or unsubstituted indenyl group and an unsubstituted or substituted mono-cyclic cyclopentadienyl ligand. Still more preferably, the unbridged Group 4 biscyclopentadienyl metallocene is (cyclopentadienyl)(indenyl) zirconium dichloride, (cyclopentadienyl)(indenyl) titanium dichloride, or (cyclopentadienyl)(indenyl) hafnium dichloride. Most preferably it is (cyclopentadienyl)(indenyl) zirconium dichloride.

SUMM The inventive process produces narrow molecular weight distribution products. As is well known in the art, a useful index of molecular weight distribution is the ratio of two melt-mass flow rates measured at 190° C. in an extrusion plastometer, one under high load conditions and one under low load conditions. Various load conditions have been employed for this purpose, but often a weight of 21.6 kg is employed in the high load condition, and 2.16 kg is used in the low load condition. These conditions correspond to ASTM D 1238, conditions F and E, respectively. The most current version of ASTM D 1238, ASTM D 1238-95, now designates these conditions as "Condition 190/21.6" and "Condition 190/2.16" respectively. The melt-mass flow rates measured under 21.6 kg and 2.16 kg loads have been known in the art respectively as HLMI (high load melt index), or I.sub.21, and MI (melt index), or I.sub.2. In this patent specification, I.sub.2 will be referred to as melt index which may be abbreviated as "MI". The new, preferred designation for "HLMI" according to ASTM D 1238-95 is "FR-190/21.6," but for the purposes of this patent specification the term "HLMI" will be used. The ratio HLMI/MI, or I.sub.21 /I.sub.2, is often referred to as "MIR" or "MFR" which mean "melt index ratio" and "melt flow ratio," respectively. In this context,

"MFR" is not to be confused with the melt-mass flow rate of polypropylenes measured under ASTM D 1238-95 Condition 230/2.16, which has also been commonly referred to as "MFR" in the polypropylene art. Herein, "MIR" will be used to refer to the ratio $HLMI/MI$. Lower MIR is indicative of narrower molecular weight distributions. Thus, in yet another embodiment, the inventive process further comprises recovering a polymer having an MIR less than 35, preferably less than 30, more preferably less than 25, and still more preferably less than 20.

SUMM The metallocene and mono-metallocene catalyst systems of the inventive process comprise a support. Any effective method of supporting coordination catalyst systems may be used to incorporate the support, effective meaning that the catalyst system so prepared can be used for preparing polymer in a gas phase or slurry polymerization process. For purposes of this patent specification the terms "carrier" or "support" are interchangeable and can be any support material, preferably a porous support material, such as for example, talc, inorganic oxides, inorganic chlorides, for example magnesium chloride and resinous support materials such as polystyrene, polyolefin or polymeric compounds, or any other organic support material, and the like, that has an average particle size greater than 10 μm .

DETD Bulk Density: The resin is poured via a 7/8" diameter funnel into a fixed volume cylinder of 400 cc. The bulk density is measured as the weight of resin divided by 400 cc to give a value in g/cc.

CLM What is claimed is:
1. A polymerization process comprising contacting, under gas-phase polymerization conditions, a) ethylene; b) optionally, one or more comonomers; and c) a metallocene catalyst system comprising a support material and a catalytic complex formed by activating a Group 3, 4, 5, or 6 unbridged biscyclopentadienyl metallocene, wherein said unbridged biscyclopentadienyl metallocene comprises an unsubstituted indenyl or tetrahydroindenyl ligand and an unsubstituted mono-cyclic cyclopentadienyl ligand.

10. A polymerization process comprising contacting, under gas-phase polymerization conditions, a) ethylene; b) optionally, one or more comonomers; and c) a mono-metallocene catalyst system comprising a support material and a catalytic complex formed by activating a Group 3, 4, 5, or 6 unbridged biscyclopentadienyl metallocene, wherein said unbridged biscyclopentadienyl metallocene comprises an unsubstituted indenyl or tetrahydroindenyl ligand and an unsubstituted mono-cyclic cyclopentadienyl ligand.

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L3 ANSWER 3 OF 3 USPATFULL on STN

ACCESSION NUMBER: 1998:27738 USPATFULL

TITLE: Process and apparatus for the gas-phase polymerization of olefins

INVENTOR(S): Govoni, Gabriele, Renazzo, Italy
Rinaldi, Roberto, Mantova, Italy
Covezzi, Massimo, Ferrara, Italy

PATENT ASSIGNEE(S): Montell North America Inc., Wilmington, DE, United States (U.S. corporation)

	NUMBER	KIND	DATE
PATENT INFORMATION:	US 5728353		19980317
APPLICATION INFO.:	US 1996-711133		19960909 (8)
RELATED APPLN. INFO.:	Division of Ser. No. US 1996-619455, filed on 20 Mar 1996, now abandoned which is a division of Ser. No. US 1995-469732, filed on 6 Apr 1995, now abandoned which is a division of Ser. No. US 1994-315669, filed on 30 Sep 1994, now abandoned which is a continuation of Ser. No. US 1993-76329, filed on 14 Jun 1993, now abandoned		

	NUMBER	DATE
PRIORITY INFORMATION:	IT 1992-MI1496	19920618
	IT 1992-MI1499	19920618
DOCUMENT TYPE:	Utility	
FILE SEGMENT:	Granted	
PRIMARY EXAMINER:	Kim, Christopher	
NUMBER OF CLAIMS:	10	
EXEMPLARY CLAIM:	1	
NUMBER OF DRAWINGS:	4 Drawing Figure(s); 4 Drawing Page(s)	
LINE COUNT:	945	
TI	Process and apparatus for the gas-phase polymerization of olefins	
SUMM	Processes comprising more than one reactor in series for the production of broad MWD polyolefins are known, both for polymerizations carried out in the liquid phase (solvent or liquid monomer) and for polymerizations in the gas phase.	
SUMM	Furthermore, gas-phase polymerization processes require that the catalysts be capable of producing polymer in the form of particles exhibiting a controlled morphology and a high bulk density, and that polymerization conditions be such as to allow an effective control of heat transfer during the course of the reaction in order to avoid fouling of the reactor walls and/or the formation of agglomerates or other drawbacks which may bring to a halt the run of the plant.	
SUMM	It has now been found that it is possible to prepare polymers or copolymers of olefins CH.sub.2 .dbd.CHR endowed with a highly homogeneous composition by gas-phase (co) polymerization processes carried out in two or more fluidized or mechanically agitated bed reactors operating under different reaction conditions, by carrying out the recycle of the polymer between the reactors at relatively low recycle ratios; the polymer forming the fluid bed or being circulated has a bulk density of greater than 0.35 g/cm.sup.3.	
DETD	In the process of the invention olefins CH.sub.2 .dbd.CHR, wherein R is hydrogen or an alkyl radical having 1-12 carbon atoms, are polymerized in the gas phase in the presence of a catalyst comprising the product of the reaction of a solid catalyst component containing a titanium compound having at least one Ti-halogen bond supported on a magnesium dihalide in active form with an Al-alkyl compound, by operating in at least two interconnected fluidized or mechanically agitated bed reactors where different reaction conditions are present. The process is characterized in that the polymer formed in the reactor where the catalyst is introduced (first reactor) is transferred into a second reactor where the polymer which is formed therein is recycled to the first reactor by using ratios between recycle	

flow rate and discharge flow rate comprised between 2 and 6 and in that the catalyst is capable of yielding a polymer having a poured bulk density (measured according to DIN-53194) of at least 0.35 g/cm.^{sup.3}.

DETD Examples of usable catalysts capable of yielding polymers endowed with the above indicated bulk density and particle size distribution characteristics are described in U.S. Pat. Nos. 5,578,541 and 5,585,317, the description thereof being herein incorporated by reference. The catalysts described therein are prepared by precontacting the solid catalyst components and the Al-alkyl compound in the substantial absence of monomer and are thereafter used in a prepolymerization step. The resultant prepolymer is fed to the gas-phase polymerization reactor. Generally, the prepolymer has a bulk density of at least 0.30 g/cc and a size comprised between 10 and 3,000 μm .

DETD According to a preferred embodiment, it is possible to prepare broad molecular weight distribution polymers or copolymers of olefins CH.sub.2 .dbd.CHR endowed with a highly homogeneous composition by gas -phase (co)polymerization processes carried out in two or more reactors by an entirely continuous process which contemplates recycling the polymer between the reactors, and packing and washing the polymer with a suitable gas at the outlet of at least one reactor.

DETD In such a process, olefins CH.sub.2 .dbd.CHR are polymerized in the presence of a catalyst capable of producing polymers having a poured bulk density (measured according to DIN-43194) of greater than 0.35 g/cm.^{sup.3} and comprising the product of the reaction of a solid catalyst component containing a titanium compound having at least one Ti-halogen bond supported on a magnesium dihalide in active form with an Al-alkyl compound, by operating in at least two interconnected fluidized or mechanically agitated bed reactors wherein different concentrations of a molecular weight regulator are present. The polymer formed in the reactor where the catalyst is introduced (first reactor) is continuously transferred into a second reactor, where the polymer which is formed therein is continuously recycled to the first reactor. The process is characterized in that the polymer exiting the reactor in which the gas phase operates at higher ratios of molecular weight regulator/monomer is continuously packed and washed with a suitable gas to remove the molecular weight regulator, and is thereafter sent to the reactor operating in the absence of the molecular weight regulator or with lower molecular weight regulator/monomer ratios.

DETD Packing is carried out so as to increase the bulk density of the polymer being transferred from the density values of the polymer bed present in the reactor to values approaching the poured bulk density of the polymer produced.

DETD Furthermore, by suitably dimensioning the packing system it is possible to achieve high mass flow rates of the polymer; very limited residence times result thus avoiding uncontrolled reactions which would invalidate the practical implementation of the process.

DETD High density polyethylene (HDPE) was prepared in a pilot plant operating continuously. The plant comprises a catalyst activation reactor, a loop reactor wherein the pre-polymerization was carried out, two fluidized bed gas-phase reactors connected in series and a recycle line between the two polymerization reactors. The gas-phase reactors were of the type described in U.S. Pat. No. 4,518,750.

DETD The fresh gas feed to the gas-phase reactors consisted of ethylene, hydrogen as the molecular weight regulator and propane. The amounts fed were such as to give the gas phase concentrations indicated in Table 1, which reports the main operating conditions of the plant and the

characteristics of the polymer produced. Melt Index "E" and Melt Flow ratio "F/E" are determined on the product obtained after extrusion and pelletization. Poured bulk density and tamped bulk density are determined according to DIN-53194.

DETD Main operating conditions of the plant and characteristics of the polymer produced are reported in Table 2; Melt Index "E" and Melt Flow ratio "F/E" are determined on the product obtained after extrusion and pelletization. Poured bulk density and tamped bulk density are determined according to DIN-53194.

DETD TABLE 1

RECYCLE RATIO 4-5

1st STAGE 2nd STAGE

Temperature

(°C.)

		60	95
Pressure	(MPa)	2.0	1.8
Propane	(% mol)	58.7	28.85
Ethylene	(% mol)	38.15	41.35
Hydrogen	(% mol)	2.15	29.8

CHARACTERISTICS OF THE FINAL PRODUCT

Poured bulk density (g/cm.sup.3)	0.436
Tamped bulk density (g/cm.sup.3)	0.463
Melt Index "E"	0.15
Melt Flow Ratio "F/E"	70.7

CLM What is claimed is:

1. An apparatus for the gas-phase polymerization of olefins CH.sub.2 .dbd.CHR, wherein R is hydrogen or an alkyl radical having 1-12 carbon atoms, comprising two fluidized bed gas-phase reactors (101 and 102) connected by means of transfer pipes (116 and 126) and provided with catalyst (110) and olefin (114 and 124) feeding systems and with gas recycle lines (112 and 122) comprising gas cooling (113 and 123) and compression (111 and 121) systems, wherein at least one (101) of the two reactors is provided with a discharge device comprising a standpipe (115) having a top end located inside the fluidized bed of the reactor (101), a bottom end connected to one (116) of the transfer pipes, and a descending section, said standpipe (115) being provided with a first valve (135) for regulating the circulation flow rate to which a gas stream is sent by means of a second valve (132), and with a third valve (131) for introducing the wash gas, and said transfer pipe (116) having an outlet into the reactor (102) and being provided with a fourth valve (133) for introducing a second gas stream located between said first valve (135) and the outlet of the transfer pipe (116) into the reactor (102).

7. An apparatus for the gas-phase polymerization of olefins CH.sub.2 .dbd.CHR, wherein R is hydrogen or an alkyl radical having 1-12 carbon atoms, comprising two gas-phase reactors (105, 106) connected by transfer pipes (156 and 166) and provided with catalyst (159) and olefin (154 and 164) feeding systems and with gas recycle lines (152 and 162) and gas compression (151 and 161) and cooling (153 and 163) systems, wherein one (105) of the two reactors is a fluidized bed reactor whilst the other (106) is a tubular reactor having a top and

a bottom wherein turbulent fluidized bed conditions are maintained, said fluidized bed reactor (105) being provided with a discharge device comprising a standpipe (155) having a top end located inside the fluidized bed of the reactor (105), a bottom end connected to the transfer pipe (156) and a descending section, said standpipe (155) being provided with a first valve (175) for regulating the circulation flow rate to which a gas stream is sent by means of a second valve (172), and with a third valve (171) for introducing the wash gas, said transfer pipe (156) having an outlet into the bottom of said tubular reactor (106) and being provided with a fourth valve (173) for introducing a second gas stream located between said first valve (175) and the outlet of said transfer pipe (156) into the bottom of said tubular reactor (106), the top of said tubular reactor (106) being connected to a solid/gas separator (165), and said solid/gas separator being connected to said gas recycle line (162) of said tubular reactor (106) and to said transfer pipe (166) which leads to said fluidized bed reactor (105).

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L1	93	SEA ABB=ON	PLU=ON	(VAPOR OR GAS) (5A) (COPOLMERI? OR POLYMERI?)
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L2	305	SEA ABB=ON	PLU=ON	(VAPOR OR GAS) (5A) (COPOLMERI? OR POLYMERI?)
				AND (MASS FLOW) (3A) (RATE# OR FLUX)
L3	3	SEA ABB=ON	PLU=ON	L1 AND L2
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